REMARKS

In connection with the specification, the Examiner states that

> More detailed descriptions for Figs. 14a and 14b are needed in order for one of ordinary skill in the art to understand how the "routing properties of an Arrayed Waveguide Grating" are utilized to stack a serial stream of packets and unstuck a composite packet. Two cited references (Page 16, Paragraph 73, Lines 10-14) do not explicitly explain how to stack a serial steam of packets to form a composite packet and unstuck (sic) a composite packet to a serial stream of packets using "the routing properties of an AWG."

Curiously, the Examiner did not put this passage in terms of either an official objection to the specification, or a rejection of the any of the claims, based on 35 USC 112, first paragraph.

The same statement was made by the Examiner in the previous Office Action, dated August 24, 2004 (and also that statement was not put in terms of an official objection or rejection), and applicants' response to that Office Action included more than a full page of text that demonstrated the fact that no additional description is necessary. It was demonstrated that the specification provides sufficient information for a skilled artisan to make and use the invention.

Although in the current Office Action the Examiner repeats the assertion made in the previous Office Action, applicants' previously submitted remarks *are not even mentioned* in the "Response to Arguments" section of the current office action. The new grounds for rejection that are presented in the current Office Action are art-based rejections and the "Response to Arguments" statement relates to that. Consequently, it appears that the Examiner failed to consider applicants' previous remarks. Applicants respectfully request that the Examiner give due consideration to applicants' arguments, and if the Examiner disagrees, give applicants the reasons for disagreeing.

In terms of a complete response to the aforementioned statement by the Examiner, applicants respectfully direct the Examiner's attention to the previously made remarks and, additionally, applicants respectfully request that the Examiner consider the following comments.

First, the two references identified in paragraph 73 were **NOT** cited in the specification for the purpose of explaining <u>how</u> to stack a serial stream of packets, as the

Examiner's statement suggests. That is amply described in the specification. Rather, the two references identified in paragraph 73 were cited for the proposition that the properties of AWG were well known in the art at the time of applicants' invention. The Examiner does not seem to dispute this fact (because the Examiner's comment is directed to the issue of understanding how the routing properties of an AWG are utilized for stacking) but if the Examiner has any doubt about the fact AWGs were well known, applicants would willingly add additional references, such as Y. Inoue et al. Athermal Silica-based Arrayed Waveguide Grating (AWG) Multiplexer ECOC97 Sep. 22-25, 1997 pp. 33-36, or a myriad of other publications (including US Patents).

Second, to make sure that the Examiner and applicants are on the same footing in connection with AWGs, the following explicitly establishes what an arrayed waveguide grating is. To wit, according to the Encyclopedia of Laser Physics and Technology[1]

> An arrayed waveguide grating is a typically fiber coupled device which can separate or combine signals with different wavelengths. It is usually built as a planar lightwave circuit, where the light coming from an input fiber first enters a multimode waveguides section, then propagates through several single-mode waveguides to a second multimode section, and finally into the output fibers. The wavelength filtering is based on an interference effect and the different path lengths in the single-mode waveguides: any frequency component of the input propagates through all single-mode waveguides, and the output in any channel results from the superposition of all these contributions, which acquire wavelength-dependent phase shifts.

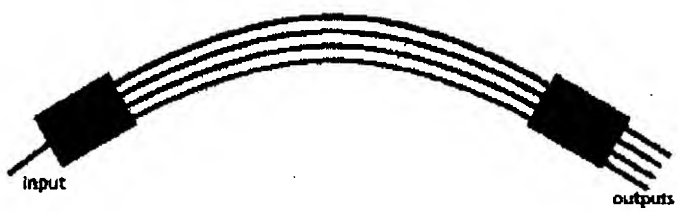

Fig. 1: Structure of an arrayed waveguide grating.

> Arrayed waveguide gratings are mainly applied in optical fiber communication systems, in particular in those based on multi-channel transmission with wavelength division multiplexing, where individual wavelength channels must be combined or separated. One may also use an arrayed waveguide grating to separate the lines in the spectrum of a supercontinuum source.

[1] http://www.rp-photonics.com/arrayed_waveguide_gratings.html

Based on the *well known characteristics* of AWG elements (as explained above by the encyclopedia reference – and please note, in particular, the last sentence) it is clear that an AWG device can be used to apply a signal that contains a plurality of wavelengths and cause each wavelength to be outputted at a different one of the AWG outputs (see Fig. 1 which is part of the Encyclopedia's definition). The fact that an AWG device can be used to apply a signal that contains a plurality of wavelengths and cause each wavelength to be outputted at a different one of the outputs is obviously supported by the teachings in the references cited in paragraph 73 of the specification, since these references use this characteristic to create an N×N optical switch.

Third, the use of the routing properties of an AWG in the context of FIGs. 14a and 14b is totally straight forward, and it is believed that an artisan with even a minimum skill in the art can create a composite packet unstacker by the use of AWG elements, since element 1505 of FIG. 14A can be easily constructed with two AWGs, as shown below,

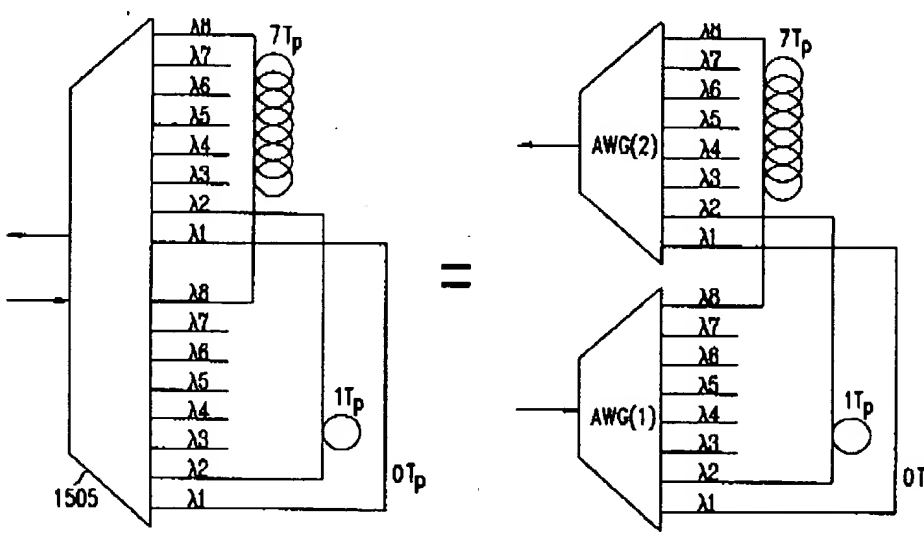

FIG. 14A

A composite packet (which is a packet that within a given time slot contains a plurality of wavelengths and a common header), is applied to AWG(1), and the outputs of AWG(1) are the signals at the different wavelengths. The signal at wavelength λ1 is delayed 0 time intervals and applied to a port of AWG(2) that corresponds to λ1. The signal at wavelength λ2 is delayed 1 time interval and applied to a port of AWG(2) that

corresponds to $\lambda 2$, and so on up to the signal at wavelength $\lambda 8$ that is delayed 7 time intervals and is applied to a port of AWG(2) that corresponds to $\lambda 8$. The output of AWG(2), therefore, presents the signal of $\lambda 1$, followed by the signal of $\lambda 2$ one time interval later, and so on until 7 intervals later it presents the signal of $\lambda 8$. This is the unstacking function. The stacking function (FIG. 14B) is completely synonymous, with the input applied to the single input side of AWG(2) and the output derived from the single input side of AWG(1).

Fourth, the Examiner is respectfully requested to consider the enclosed 37CFR1.132 Declaration.

It is respectfully submitted that a considered assessment of applicants' response will clearly overcome any assertion of a deficiency in the specification.

The specification was objected to because claim 1 contained a typographical error. The error is corrected herein.

Claim 3 was rejected under 35 USC 112, second paragraph because, according to the Examiner, "it is not clear what the recited limitation means." Applicants respectfully traverse.

The Examiner has not indicated what word, or phrase, in claim 3 makes the claim unclear. The Examiner's remarks, therefore, are insufficient. From applicants' view, on the other hand, the claim means what it says. To elaborate, claim 1 specifies a step of dropping a composite packet. According to the specification, a composite packet is constituted from a preselected plurality of signals, each of which is a digital signal that is modulated onto a carrier, and the carriers have different wavelengths. These different digital signals that are modulated onto different carriers are the constituent packets of the composite packet. This notion is quite clearly described in the specification. One result of the claim 1 method is that there is a composite packet that was dropped from the WDM packet-switched optical ring network. Claim 3 specifies the additional step of decomposing the dropped composite packet into is constituent packets. The word "decomposing" (according to the word's dictionary definition) means to separate something into its component parts, and that is precisely what claim 3 specifies.

It is hard to shake the feeling that some stumbling block is facing the Examiner, because the issues addressed so far appear totally straight forward. It is hoped that the Examiner will overcome this stumbling block, or offer applicants a clearer and a more extensive explanation of what is troubling the Examiner.

Claims 1-2, 5-7 9, and 11 were rejected under 35 USC 102 as being anticipated by Zang et al, in the article titled "Photonic slot routing in all-optical WDM Mesh Networks," Global Telecommunications Conference, *Globercom '99*. Applicants respectfully traverse.

The Zang et al article employs the "photonic slot" concept that, in a sense, is similar to what the instant application calls a "composite packet." The Zang et al photonic slot occupies a time slot, packets at different wavelengths at placed into the slot at will, and the time slot has a common destination address for all of that packets that are carried in that time slot. Page 1449, right column, lines 29-32. It differs however, in that it does not really consider *composite* packets, where a packet is as commonly defined; that is, a collection of information that is figuratively contained in an addressed envelope that is handled as a unit. Rather, photonic time slots are assigned a destination in accordance with a selected one of a number of possible slot-assignment policies, and those photonic slots are then populated with packets.

Structurally, the article describes (in figure 1) a 4×4 optical packet switch that operates at the "photonic slot" rate. Three of the switch inputs are connected to optical links (via interposed delay lines), and the fourth input is connected to a delay element that is connected to an output of the switch. There no indication that the node described in the article can be used in a ring network.

In operation, the control channels of the packets arriving at the three optical links are accessed (by means of demultiplexers) and the destinations of the photonic time slots are ascertained. Based on those addresses, the photonic time slots are routed through the optical packet switch. It is noted that the interposed delay lines provide a time delay that is necessary for processing the destination addresses before the switching must take place. The article recognizes that a conflict can occur when the information of two photonic time slots need to be routed to a given output of the 4×4 optical packet switch,

and to overcome this a delay element is provided between the 4th output and the 4th input. When a conflict is detected, one of the composite packets is routed to the 4th output, and is delayed. Lastly, figure 1 shows a means to add individual packets to time slots. This is accomplished with transmitter elements and couplers associated with each of the optical links that are connected to the first three outputs of the switch. Thus, when "a photonic slot departing on the top output fiber link contains packets on wavelengths $\lambda 1$ and $\lambda 2$," "the node may then insert a packet into the photonic slot on wavelength $\lambda 3$," page 1450, left column, lines 1-4.

It is respectfully submitted that at the time of publication of the reference, per packet optical switches of the type employed in the Zang et al figure 1 did not exist. This is a effectively a "what if we could" article. Since the reference fails to teach a skilled artisan how to make that which is described, it is not enabling.

Further, the described design is not operative in the sense that it does not account for three-way conflicts and, perhaps even more importantly, it does not account for the fact that once a conflict arises it is not clear when the delay can be compensated. In fact, no facility is described for handling the situation if another routing conflict arises before the first conflict is somehow compensated for – which will arise with the same probability that gave rise to the first conflict. Stated in other words, even if the optical switch were available, the described arrangement will not operated properly in that either packets may be delayed and unknown amount of time, or possibly lost.

It is respectfully submitted that

> in order to anticipate, a prior art reference must be enabling, thus placing the allegedly disclosed matter in the possession of the public. Robert L. Harmon, *Patents and the Federal Circuit, Sixth Edition*, §3.2(c),

citing *Akszo N.V. v. United States ITC*, 808 F.2d 1471, 1 USPQ2d 1241 (Fed. Cir. 1986); *Ashland Oil, Inc. b. Delta Resins & Refacs., Inc.*, 776 F.2d 281, 227 USPQ 657 (Fed. Cir. 1985), and *Reading & Bates Constr. Co. v. Baker Energy Res. Corp.*, 748 F.2d 645; 223 USPQ 1168 (Fed. Cir. 1984).

Since the Zang et al article is not enabling, it cannot be used as a reference in a 35 USC 102 rejection.

Independently of the whether the Zang et al article can be used, it is noted that, as indicated above, the article teaches accessing the address field of the time slot of the three optical links that are coupled to the switch. However, it does not teach dropping *a composite packet* locally; i.e., as a packet, or as a unit. Also, the article teaches inserting packets into selected wavelengths of the optical links that are connected to the outputs of the switch, but does not teach adding *a composite packet* locally; i.e., as a packet, or as a unit. That is not surprising because, as discussed above, the article has the notion of an addressed photonic time slot; and not the notion of a composite packet which, as indicated above, is a collection of information that is figuratively contained in an addressed envelope that is handled as a unit.

Amended claim 1, in contradistinction, specifies a method used in connection with a node connected to a ring network, where the node creates

> a composite packet that contains a plurality of constituent packets that are not constrained to all have a particular node of the network as the ultimate destination of the constituent packets.

A node of a ring network is not described, and no such creation of packets is taught in the article.

Amended claim 1 further specifies the step of

> dropping from said network, at said node A, a composite packet that is destined for said node A

which, as discussed above, is not taught by the article.

To conclude, it is respectfully submitted that claim 1 is patentable over the Zang et al reference both because the reference is not enabling and consequently cannot be used, and because, even if used, the reference does not describe that which claim 1 specifies.

Claim 2 depends on claim 1.

Claim 5 also defines a method executed within a node of a ring network and that node creates a composite packet, and further specifies the steps by which the composite packet is created. As demonstrated above, the Zang et al reference does not have composite packets, and even if one were to argue that the photonic slots, once they are given an address and are populated with individual packets (at different wavelengths), constitute composite packets, it remains that those "packets" are not created as units, but

are rather dynamically built up, and broken down, as individual packets are added and dropped, respectively. Certainly, there is no teaching of a step of creating a plurality of packets, each being generated at different wavelength and then stacking them to form composite packets. To put simply, no operation akin to the step of stacking is described or suggested by the reference.

As for claim 7, as indicated above, the reference does not teach any dropping of a composite packet, or even the dropping of all of the individual packets as a group. There is only a teaching of extracting the destination address of a photonic slot. This extracting of an address is shown in Figure 1 to be by means of a demultiplexer. Claim 7, in contradistinction, defines the step of dropping (specified in claim 1) to take place "by operation of a control signal at an <u>optical switch</u>" (emphasis supplied), in contradistinction to the demultiplexer outside the switch. Clearly, therefore, claim 7 is not anticipated by Zang et al.

Claims 3-4, 12, 14-16 and 19 were rejected under 35 USC 103 as being unpatentable over the Zang et al reference in view of Sasayama et al, US Patent 5,485,943. Applicants respectfully traverse.

First, it is noted that in *Beckman Instr., Inc. v. LKB Produkter AB*, 892 F.2d 1547, 13 USPQ2d 1301 (Fed. Cir. 1989) the Federal Circuit approved a jury instruction to the effect that references relied upon to support a rejection for obviousness must provide an enabling disclosure, <u>and in the instant case applicants submit that the Zang et al reference is not enabling</u>. While the reference teaches the notion of a photonic slot that, at least while it passes through a network and is routed through a switch, the photonic slot can be viewed almost as a composite packet, and that might suggest that the collection of packets carried in the photonic slot be treated as a composite packet. This, however, is the extent of what is believed to be suggested by the Zang et al reference as it relates to the subject claims. However, other than mere transmission over an optical link, nothing else in the Zang et al reference suggests how such a packet would be used. There is no teaching in the Zang et al reference of a creation of a composite packet, or the dropping of the packet as a unit. Claim 3, in contradistinction, specifies not only the step of dropping but also the subsequent step of decomposing the dropped composite packet into

constituent packets. No such step is suggested by Zang et al and no such step appears necessary in the way Zang et al intend to use the system. Therefore, there is no motivation for creating composite packets.

The Examiner's asserts that it is well known in the art to decompose a dropped composite packet into constituent part packets, and in support of this assertion the Examiner cites the Sasayama et al patent. However, applicants respectfully maintain that the Sasayama et al patent does not support the Examiner's assertion. It does not describe composite packets, it does not describe any dropping of packets (composite or otherwise) and it does not describe a method for decomposing a dropped composite packet into its constituent packets. What the Sasayama et al patent describes is "a photonic FIFO buffer for connecting signals from a plurality of input highways to a single output highway" col. 1, lines 16-18, with a structure that employs switches and delay elements which, according to Sasayama et al, overcomes deficiencies of prior art FIFO buffers that perform this function. Sasayama et al simply take a collection of packets arriving, effectively, in a two dimensional steam (time and wavelength being the two dimensions) and converting this two dimensional stream into a one-dimensional stream (time being the one dimension). The is no notion of composite packets, and no notion of decomposing packets. It is respectfully submitted that in addition to the fact that Zang et al do not describe or suggest creating composite packets, and decomposing composite packets and provide no motivation for doing so, a skilled artisan would not be motivated to be prompted by the Sasayama et al reference to try doing so. Therefore, it is believed that claim 3 is not obvious in view of the Zang et al and Sasayama et al patent. Claim 12 is similar to claim 3.

Claim 4 specifies a step of decomposing the dropped composite packet into a partial composite packet that contains only some of the packets that normally constitute a composite packet. Since the Sasayama et al patent's sole function is to create a "single output highway," there is nothing in the Sasayama et al patent that would suggest the limitation of claim 4.

As for claim 15, it focuses on the step of creating a composite packet. The Sasayama reference does not create anything akin to the input to which it is responsive, and it certainly does not create composite packets. Moreover, claim 15 specifies two

steps, where the first step creates delayed packets, and the second step combines the delayed packets. That does not encompass methods that are different from that which is specified where, for example, a packet is delayed, added to something, another packet is delayed and added to that something, etc. It is noted that even the decomposing method that is described in the Sasayama et al patent does not correspond to the approach defined in claim 15.

As for claim 16, the combination of Zang et al and Sasayama does not describe a ring network, does not describe composite packets, does not describe dropping composite packets, does not describe at least partially unstacking the dropped composite packet, and does not describe creating a composite packet. In short, practically nothing that claim 16 specifies is actually found in the combination of Zang et al and Sasayama et al.

In regard to claim 19, for the reasons expressed above, applicants respectfully submit that the step of

> in an information-handling module of a node of said network, transforming information between non-composite packets and composite packets by use of a stacking technique, or an unstacking technique, or both

is not described or suggested by the combination of Zang et al and Sasayama et al.

Claim 8 was rejected under 35 USC 103 as being unpatentable over Zang et al in view of Adams et al, US Patent 6,748,175. Applicants respectfully traverse.

The Zang et al reference concerns itself with a mesh network (note the article's title), and drops or adds individual packets of particular wavelengths – see the different transmitters in Figure 1. Adding the Adams et al reference to the Zang et al reference suggests that dropped packets may be put onto a WDM ring, but it does nothing to suggest that a ring network that carries composite packets drop composite packets, and dropped composite packets are distributed to a plurality of user sites using WDM techniques.

Claim 10 was rejected under 35 USC 103 as being unpatentable over Zang et al in view of Adams et al and further in view of Mizrahi, US Patent 5,748,349. Applicants respectfully traverse. Claim 10 depends on claim 8, and the added Mizrahi reference

does not affect the patentability of claim 8. Therefore, claim 10 is patentable over the Zang et al, Adams et al, and Mizrahi combination of references.

Claim 13 was rejected under 35 USC 103 as being unpatentable over Zang et al in view of Sasayama et al and further in view of Adams et al. Applicants respectfully traverse. Claim 13 depends on claim 12, and since claim 12 is not obvious in view of the cited combination of references, neither is claim 13.

Claims 17-18 were rejected under 35 USC 103 as being unpatentable over Zang et al in view of Sasayama et al and further in view of Mizrahi. Applicants respectfully traverse. Claim 17 specifies a step of at least partially unstacking the dropped composite packet, where the partially unstacking is accomplished by use of fiber Bragg grating elements. Mizrahi, in contradistinction, employs Brag grating elements to do add/drop multiplexing – which does not have a time-shifting component that is required in a process of unstucking a composite packet. Claim 18 depends on claim 17.

In light of the above amendments and remarks, applicants respectfully submit that all of the Examiner's rejections and objections have been overcome. Reconsideration and allowance are respectfully solicited.

Respectfully,
Mikhail Boroditsky
Nicholas Frigo

Dated: 10/27/05

By [signature]

Henry T. Brendzel
Reg. No. 26,844
Phone (973) 467-2025
Fax (973) 467-6589
email brendzel@comcast.net